

Subject: Re: Beam Finite element model

Date: Friday, July 1, 2011 3:08 PM

From: Wieseman, Carol d. <carol.d.wieseman@nasa.gov>

To: "Proctor, Lance (LARC-D206)" <lance.l.proctor@nasa.gov>

One version of the BDF file.

Frequencies he says I should obtain

- 1 1st flap bending 25.33879547
- 2 2nd flap bending 78.63642299
- 3 1st pivot bending 115.9355457
- 4 3rd flap bending 158.4076216
- 5 4th flap bending 243.5130906
- 6 Torsion dominated 267.2832143
- 7 2nd pivot bending 269.9123641
- 8 342.0978444
- 9 424.5241117

These are the frequencies Alexander had provided in an email

Questions/issues that could be causing mismatched.

- Vector X1,X2,X3 on CBEAM cards - I used $-\cos(\alpha), 0, \sin(\alpha)$
- have I got the offset definitions properly defined - W1A-W3A, W1B-W3B
- have I got the M1,M2, N1,N2 properly defined.
- are the inertias properly defined in the right coordinate system.

I have tried lots of permutations with minimal impact.

I'm not sure which I should give you.

- I've included 2

The ocs is original coordinate system Boucke provided

Ccs - is modified

Where $x_{new}=x$

$Y_{new}=Z$

$Z_{new}=-Y$

o1 - I included the offsets

nsm1 - leaves the rho including the NSM

nm1 - The N and the M are the same - per email of Boucke who thought the elastic axis and the center of the mass would be close enough that I could assume they were the same

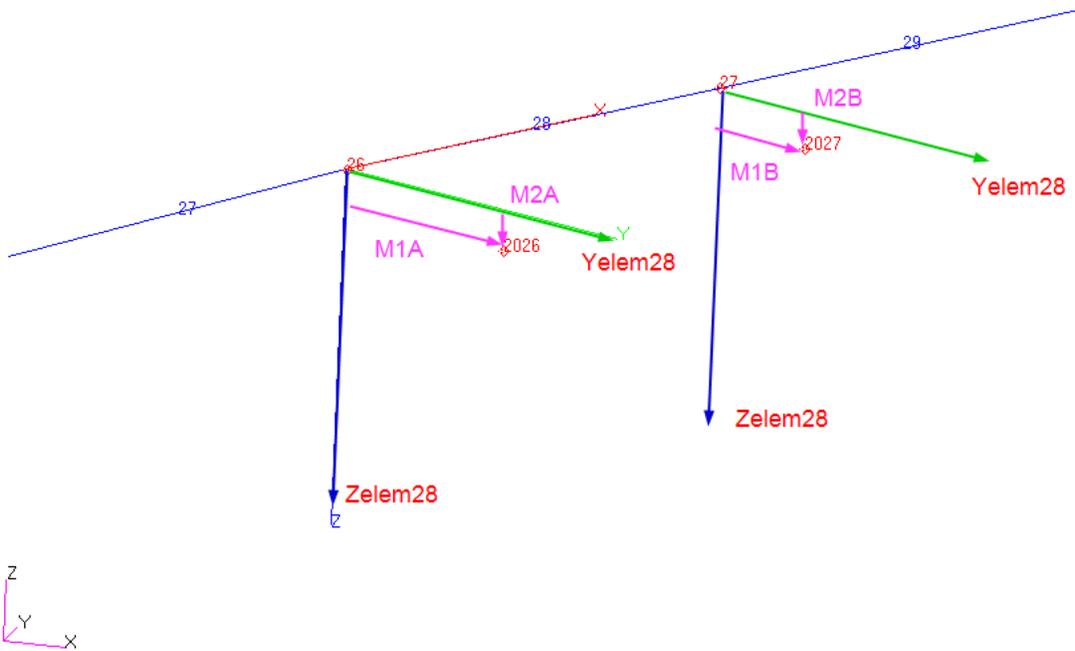
K - means I included the K as Kappa - per email of Boucke

Subject: Definition of Offsets for NSM from Shear Center

Date: Friday, July 1, 2011 6:54 PM

From: Proctor, Lance (LARC-D206) <lance.l.proctor@nasa.gov>

To: "Wieseman, Carol d." <carol.d.wieseman@nasa.gov>



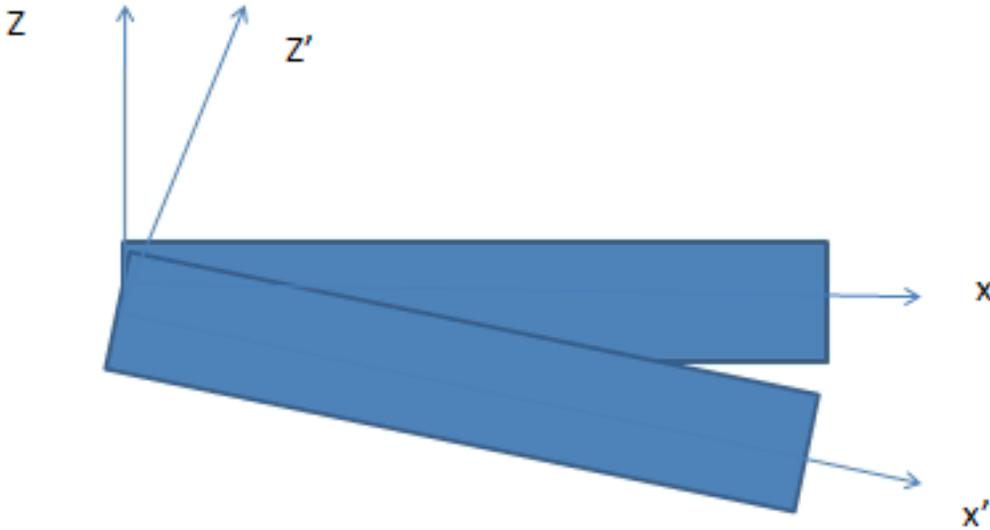
=====
Lance Proctor
lance.l.proctor@nasa.gov
757 864 2107
=====

Subject: direction cosine for orientation of twisted section

Date: Friday, July 1, 2011 5:05 PM

From: Proctor, Lance (LARC-D206) <lance.l.proctor@nasa.gov>

To: "Wieseman, Carol d." <carol.d.wieseman@nasa.gov>



Direction cosine of $x', z' = \text{Cos}(\alpha), 0, -\text{Sin}(\alpha)$

=====
 Lance Proctor
 lance.l.proctor@nasa.gov
 757 864 2107
 =====

We are assuming alpha is 0 and the alpha is incorporated by changing the inertias of each element - thus all the files say 100

		Boucke	nca_0_sa_cc s_o1_k_nsm 1_nm1	beam_nca_0 _sa_ocs_o1_ k_nsm1_nm1
Mode			CYCLES	CYCLES
1	1st flap bendir	25.3387955	26.38871	26.37897
2	2nd flap bendi	78.636423	83.67869	83.69332
3	1st pivot bend	115.935546	107.8444	119.0456
4	3rd flap bendi	158.407622	169.797	171.21
5	4th flap bendi	243.513091	247.7566	257.689
6	Torsion domin	267.283214	263.5832	270.3824
7	2nd pivot bend	269.912364	305.1284	278.7408
8		342.097844	387.8632	385.7921
9		424.524112	451.3539	430.6108
10			490.4284	505.545

On 6/29/11 1:29 PM, "Wieseman, Carol d." <carol.d.wieseman@nasa.gov> wrote:

- > As per my phone message... I received a timoshenko beam model from A.Boucke
- > in Germany and am trying to get a NASTRAN model with it.
- >
- > I would think it should have been quick but my answers don't match him and
- > I'm not sure that I am calculating the coordinate system vector on the CBEAM
- > card properly or the N's and M's on the PBEAM card correctly either.
- >
- > Also a question of the inertias as to whether I need to calculate them for
- > the alpha that is involved.
- >
- > Not sure how well you know matlab but I created a matlab file to create the
- > bdf nastran input but I won't send you that. I'll just send you the input
- > file.
- >
- > Do you have any time to help me with this?
- >

--

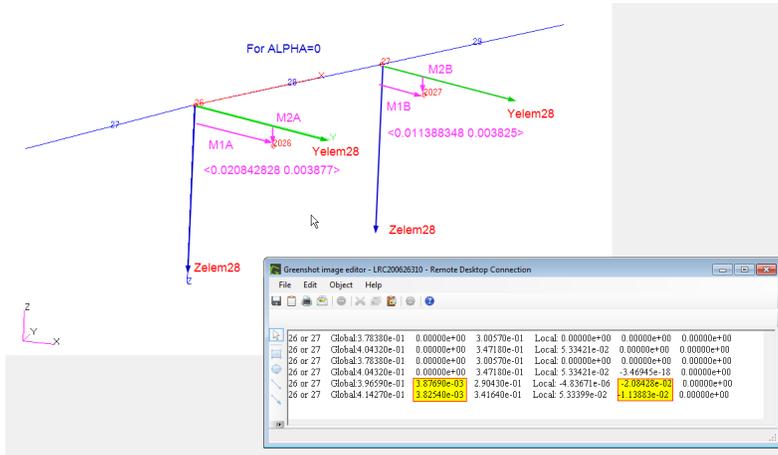
Carol D. Wieseman

Subject: RE: Definition of Offsets for NSM from Shear Center (with values for Alpha=0.0)

Date: Friday, July 1, 2011 7:46 PM

From: Proctor, Lance (LARC-D206) <lance.l.proctor@nasa.gov>

To: "Wieseman, Carol d." <carol.d.wieseman@nasa.gov>



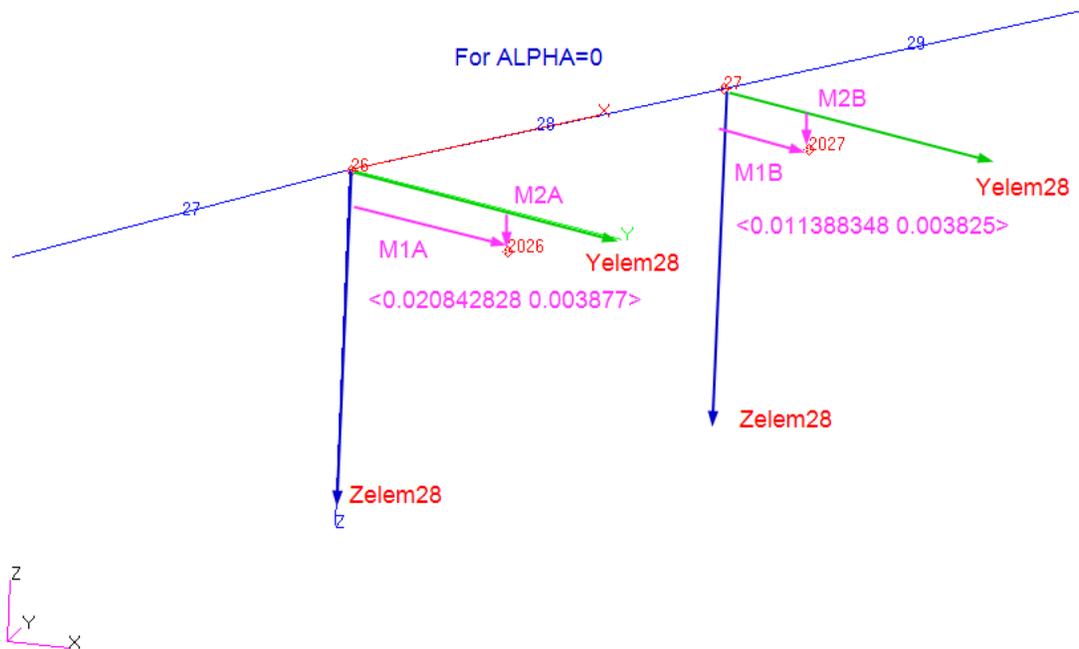
=====
 Lance Proctor
 lance.l.proctor@nasa.gov
 757 864 2107
 =====

From: Wieseman, Carol D. (LARC-D308)
Sent: Friday, July 01, 2011 7:39 PM
To: Proctor, Lance (LARC-D206)
Subject: Re: Definition of Offsets for NSM from Shear Center (with values for Alpha=0.0)

26 or 27	Global:3.78380e-01	0.00000e+00	3.00570e-01	Local:
	0.00000e+00	0.00000e+00	0.00000e+00	
26 or 27	Global:4.04320e-01	0.00000e+00	3.47180e-01	Local:
	5.33421e-02	0.00000e+00	0.00000e+00	
26 or 27	Global:3.78380e-01	0.00000e+00	3.00570e-01	Local:
	0.00000e+00	0.00000e+00	0.00000e+00	
26 or 27	Global:4.04320e-01	0.00000e+00	3.47180e-01	Local:
	5.33421e-02	-3.46945e-18	0.00000e+00	
26 or 27	Global:3.96590e-01	3.87690e-03	2.90430e-01	Local:
	-4.83671e-06	-2.08428e-02	0.00000e+00	
26 or 27	Global:4.14270e-01	3.82540e-03	3.41640e-01	Local:

5.33399e-02 -1.13883e-02 0.00000e+00

On 7/1/11 7:21 PM, "Proctor, Lance (LARC-D206)"
<lance.l.proctor@nasa.gov> wrote:



=====
Lance Proctor
lance.l.proctor@nasa.gov
757 864 2107
=====

--

Carol D. Wieseman
NASA Langley Research Center
MS 340
Hampton, VA 23681
757-864-2824 (W)
757-864-8678 (Fax)

Subject: BeamFEM

Date: Tuesday, July 5, 2011 4:37 PM

From: Wieseman, Carol d. <carol.d.wieseman@nasa.gov>

To: "Proctor, Lance (LARC-D206)" <lance.l.proctor@nasa.gov>

The way I had the coordinate system before - nca_0_sa instead of ca_0_nsa which is what you had suggested gets me with y in the opposite direction and z up instead of z down. I guess it is just a personal preference but the N's and the M's need to be properly defined. I'm still not sure I'm doing it right with either coordinate system.

How did you calculate them in Patran to be able to put them on the figure

-

pls contact me when you get a chance. Thanks.

--

Carol D. Wieseman
NASA Langley Research Center
MS 340
Hampton, VA 23681
757-864-2824 (W)
757-864-8678 (Fax)

Subject: RE: BeamFEM

Date: Tuesday, July 5, 2011 8:41 PM

From: Proctor, Lance (LARC-D206) <lance.l.proctor@nasa.gov>

To: "Wieseman, Carol d." <carol.d.wieseman@nasa.gov>

Hi Carol,

To obtain the measurements in my figure:

I created a Patran coordinate frame by defining the points - since you had the grids for the shear center, this was easy. I did offset one of the nodes in CS 0 x direction (Coord system 0 x direction). Then in Meshing, I did Show Node Distance to measure the points using the new coordinate system as reference. Note: by using the offset, I did not account for the alpha (twist), but this could be performed by another coordinate system transformation. The lines I drew in the plot were enhanced with greenshot - this made it easy to draw the parallel coordinate system at shear center for node 'b'

Hope it helps. Call my cell if you want to set aside an hour or so to review your results.

BTW, I think you should restore the "K" values (he called them kappa) based on his description.

I would have used Patran pcl (patran command language) to do what you did in Matlab (two reasons: 1 - I know pcl, 2 - I get immediate graphical feedback), but there is nothing fundamentally wrong with your approach - either way is a lot of bookkeeping and head scratching....to each his own :-)

Sorry you missed tennis - hopefully you were able to smooth it over.

From: Wieseman, Carol D. (LARC-D308)
Sent: Tuesday, July 05, 2011 5:41 PM
To: Proctor, Lance (LARC-D206)
Subject: Re: BeamFEM

How did you get the coordinate frames up and drawn going through the shear centers and not the Grid points?

On 7/5/11 4:37 PM, "Wieseman, Carol d." <carol.d.wieseman@nasa.gov> wrote:

> The way I had the coordinate system before - nca_0_sa instead of
> ca_0_nsa
> which is what you had suggested gets me with y in the opposite direction
> and
> z up instead of z down. I guess it is just a personal preference but
> the
> N's and the M's need to be properly defined. I'm still not sure I'm
> doing
> it right with either coordinate system.
>
> How did you calculate them in Patran to be able to put them on the

Subject: RE: BeamFEM

Date: Wednesday, July 6, 2011 10:13 AM

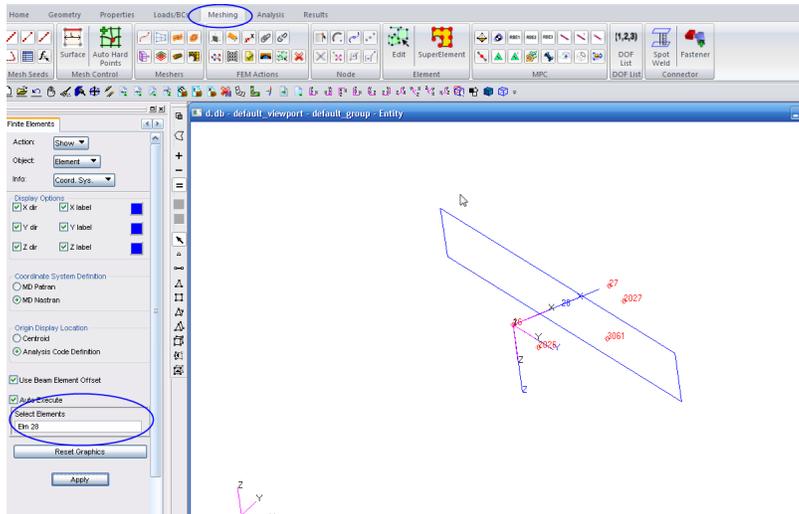
From: Proctor, Lance (LARC-D206) <lance.l.proctor@nasa.gov>

To: "Wieseman, Carol d." <carol.d.wieseman@nasa.gov>

Hi Carol,

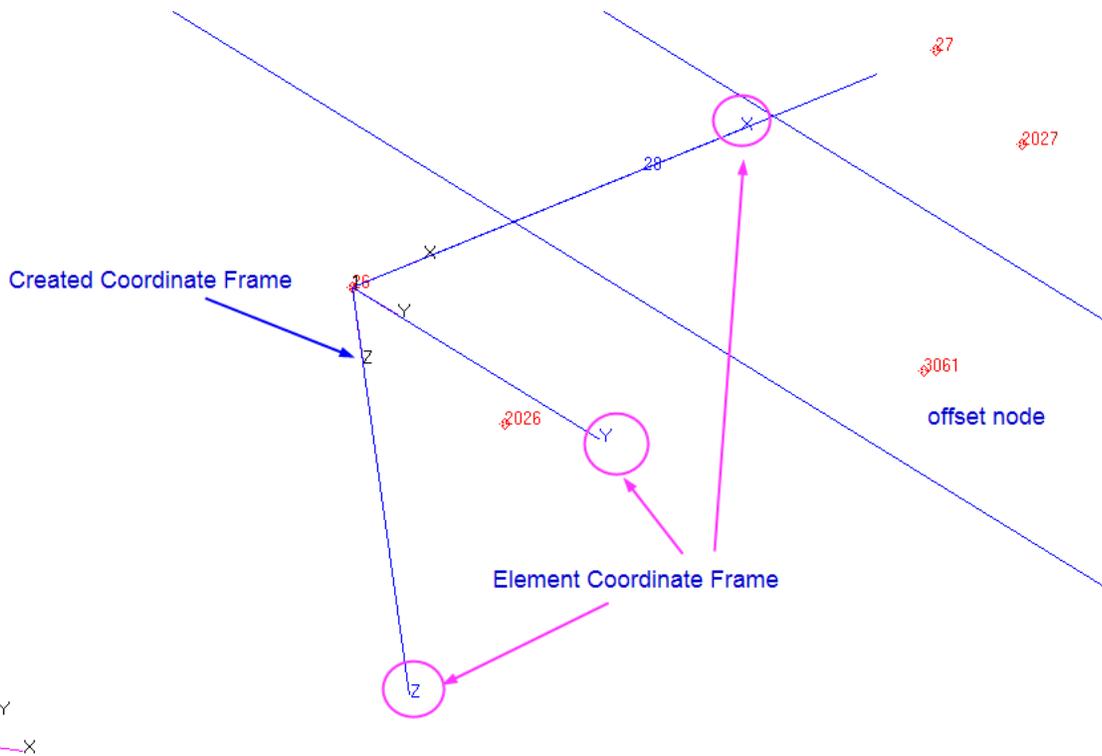
I'll be in PA all week. We have the fortune of good weather this week.

The element coordinate frame can be shown from the meshing tab:

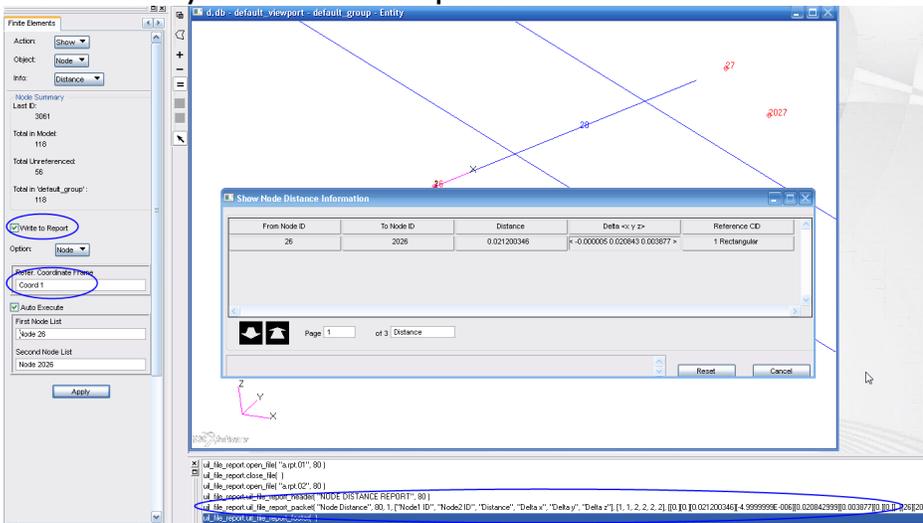


Here is the session file that created the local coordinate system ("created coordinate frame"). The "fem_translate_nodes_2" did a simple offset in the X0 direction. To be correct, this offset should include the "alpha" twist.

```
STRING fem_transform_node__created_ids[VIRTUAL]
STRING fem_transform_node__deleted_ids[VIRTUAL]
$ create a node offset the "A" shear axis - this should include any twist angle.
$If no twist angle, the offset is in the X direction
$ this node will be in the "xy plane" of the new coordinate frame
fem_translate_nodes_2( "#", "<.05 0 0>", 0.050000001, FALSE, "Coord 0", 1, @
FALSE, 2, "Node 26", fem_transform_node__created_ids, @
fem_transform_node__deleted_ids )
$# === 1 node created. ID = 3061.
$ create a new coordinate frame using the shear centers and the translated
node.
$ This will be parallel to the Nastran element coordinate system
STRING asm_create_cord_axi_created_ids[VIRTUAL]
asm_const_cord_axis( "1", "XY", "Coord 0", 1, "Node 26", "Node 27", @
"Node 3061", asm_create_cord_axi_created_ids )
```



The created coordinate frame xyz axes are now in the same orientation as the element coordinate frame. You can use Show Node Distance to get the distances measured in the created coordinate frame. The distances do not echo to the session file unless you turn the report on:



Hope this helps,
Lance

=====

Subject: RE: BeamFEM

Date: Thursday, July 7, 2011 10:07 AM

From: Proctor, Lance (LARC-D206) <lance.l.proctor@nasa.gov>

To: "Wieseman, Carol d." <carol.d.wieseman@nasa.gov>

The element cs is defined as shear center to shear center, Patran may not show the offsets, but if you create an new cs, you can define it using the grids that define the shear center (and include alpha).

=====
Lance Proctor
lance.l.proctor@nasa.gov
757 864 2107
=====

From: Wieseman, Carol D. (LARC-D308)

Sent: Wednesday, July 06, 2011 12:53 PM

To: Proctor, Lance (LARC-D206)

Subject: Re: BeamFEM

I thought the elemental X coordinate system would be positioned at the grid point that is the shear center. For this beam element points 26 and 27 are both shear centers but other elements they aren't and I'm not seeing the elemental X pointed from the shear center in the direction of the adjacent shear center.

Glad you are having nice weather. We are having "wonderful" grass growing weather.

On 7/6/11 10:13 AM, "Proctor, Lance (LARC-D206)"

<lance.l.proctor@nasa.gov> wrote:

Hi Carol,

I'll be in PA all week. We have the fortune of good weather this week.

The element coordinate frame can be shown from the meshing tab:

Subject: FW: Definition of Offsets for NSM from Shear Center (with values for Alpha=0.0)

Date: Wednesday, July 13, 2011 10:43 AM

From: Proctor, Lance (LARC-D206) <lance.l.proctor@nasa.gov>

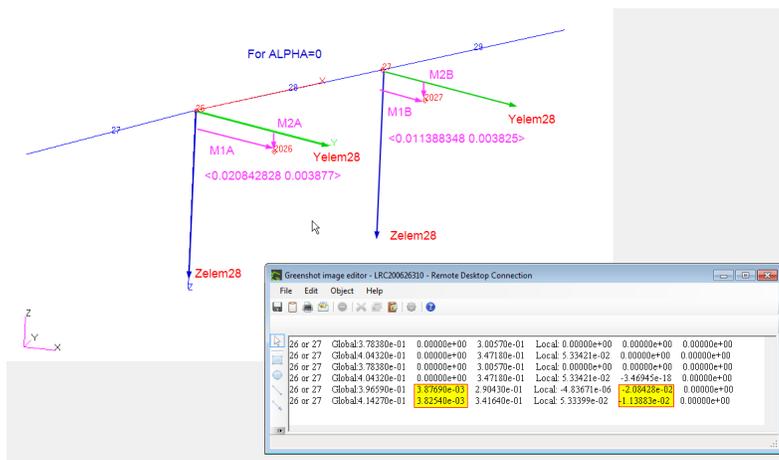
To: "Wieseman, Carol d." <carol.d.wieseman@nasa.gov>

From: Proctor, Lance (LARC-D206)

Sent: Friday, July 01, 2011 7:46 PM

To: Wieseman, Carol D. (LARC-D308)

Subject: RE: Definition of Offsets for NSM from Shear Center (with values for Alpha=0.0)



=====
Lance Proctor
lance.l.proctor@nasa.gov
757 864 2107
=====

From: Wieseman, Carol D. (LARC-D308)

Sent: Friday, July 01, 2011 7:39 PM

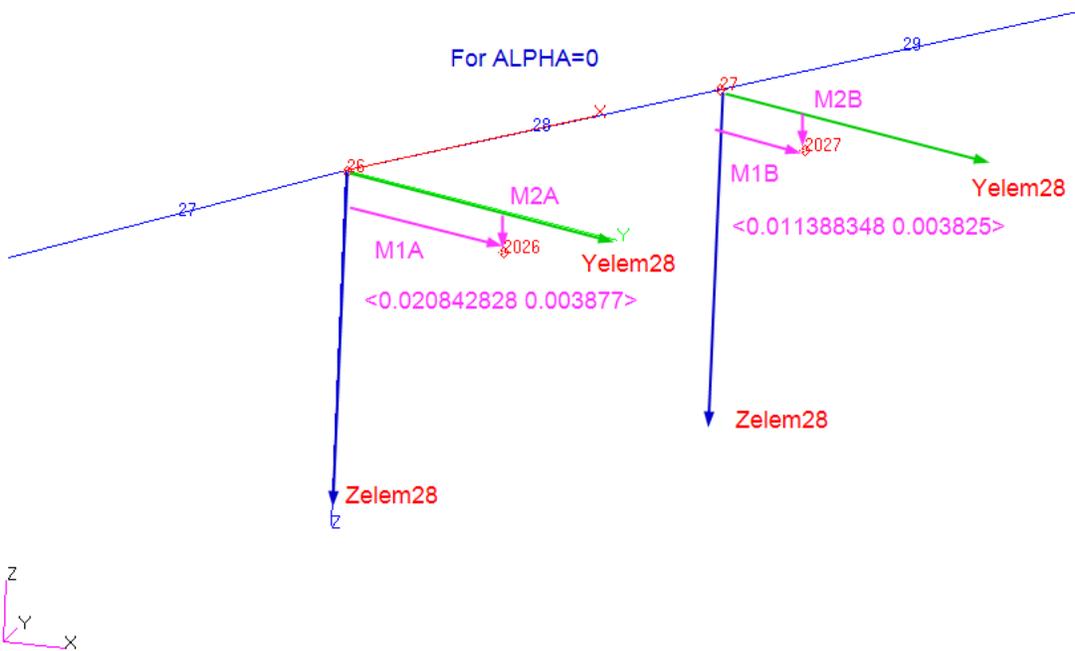
To: Proctor, Lance (LARC-D206)

Subject: Re: Definition of Offsets for NSM from Shear Center (with values for Alpha=0.0)

26 or 27 Global:3.78380e-01 0.00000e+00 3.00570e-01 Local:
0.00000e+00 0.00000e+00 0.00000e+00
26 or 27 Global:4.04320e-01 0.00000e+00 3.47180e-01 Local:
5.33421e-02 0.00000e+00 0.00000e+00

26 or 27	Global:3.78380e-01	0.00000e+00	3.00570e-01	Local:
	0.00000e+00	0.00000e+00	0.00000e+00	
26 or 27	Global:4.04320e-01	0.00000e+00	3.47180e-01	Local:
	5.33421e-02	-3.46945e-18	0.00000e+00	
26 or 27	Global:3.96590e-01	3.87690e-03	2.90430e-01	Local:
	-4.83671e-06	-2.08428e-02	0.00000e+00	
26 or 27	Global:4.14270e-01	3.82540e-03	3.41640e-01	Local:
	5.33399e-02	-1.13883e-02	0.00000e+00	

On 7/1/11 7:21 PM, "Proctor, Lance (LARC-D206)"
 <lance.l.proctor@nasa.gov> wrote:



=====
 Lance Proctor
 lance.l.proctor@nasa.gov
 757 864 2107
 =====

--